

Kyle (D. B.)

A STUDY
OF THE
MODE OF ACTION OF ICHTHYOL
IN
INFLAMMATORY CONDITIONS.

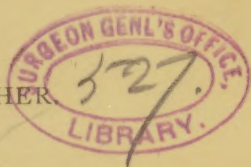
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A Study of the Mode of Action of Ichthyol in Inflammatory Conditions.

AT the request of Professor H. A. Hare the writer undertook a research to determine, if possible, what changes were produced in an inflamed area by the use of ichthyol, since the very extraordinary effects of this substance upon inflamed tissues render it important to place its use on a rational basis.

Its power in causing absorption of inflammatory exudations in acute and chronically inflamed joints, or in the true skin and subcutaneous tissues, is certainly scarcely less than marvellous.

Having produced inflammation in the subcutaneous tissues in rabbits by trauma, care being taken not to break the surface continuity or to devitalize connective tissue, the writer made careful microscopical examination of sections obtained from these parts. Before and after each experiment the part was shaved and cleansed with ethereal soap and water, alcohol and ether; this was done to avoid any of the ointment coming in direct contact with the inflamed tissue when exposed for removal.

The sections were hardened for ten hours in



picric and chromic acid, then infiltrated with acacia, and cut by means of a microtome, using the carbon dioxide freezing apparatus; in each case the writer endeavored to obtain a transverse section. The infiltrating material was dissolved by ammonium and water. The sections were then stained with lithio-carmin, cleared in dilute hydrochloric acid, alcohol, and creosote; then mounted in Canada balsam, and examined with a three-fourths and one-fifth objective.

The slides were made up as follows:

1. From normal tissue to obtain a standard.
2. From inflamed tissue to obtain an abnormal standard.
3. From inflamed tissue with rubbing; no lanolin or ichthyol.
4. From inflamed tissue; ichthyol; no rubbing.
5. From inflamed tissue; ichthyol and rubbing.
6. From inflamed tissue; lanolin; no rubbing.
7. From inflamed tissue; lanolin and rubbing.
8. From inflamed tissue; ichthyol and lanolin; no rubbing.
9. From inflamed tissue; ichthyol and lanolin and rubbing.

The object, of course, in each case was to eliminate the action of any part of the experiment which might render the result uncertain, since rubbing or massage of itself has marked effects in dispersing inflammatory processes.

The following is a summary of the appearance of the slides:

Slide 1.—Normal.

Slide 2.—Simple inflamed tissue showed the

markedly infiltrated area of ordinary inflamed tissue, which is too well known to necessitate description.

Slide 3.—Inflamed tissue with rubbing; no lanolin; no ichthyol; inflammatory area more diffused and somewhat irregular; leucocytes many, granular, and irregular; the cells around vessel not so compact as in Slide 2; intercellular spaces not so dense.

Slide 4.—Inflamed tissue with ichthyol; no rubbing; inflammatory area fairly compact, unevenly distributed; many fine oil globules not well disseminated,—bunched; inflammatory spaces are fairly clear.

Slide 5.—Inflamed tissue with ichthyol and rubbing; much the same as Slides 3 and 4, but is better; leucocytes small, granular, and degenerated; perivascular tissue not dense; oil globules fine and well disseminated. In part of section showing blood-vessel with surrounding inflammatory area the infiltration close to the vessel was most marked, yet not sufficiently compact to cause much extravascular pressure, the surrounding tissue only showing slight infiltration; the exudate was more scattered.

Slide 6.—Inflamed tissue with lanolin; no ichthyol; no rubbing. Practically the same as Slide 2, except presence of large fat globules.

Slide 7.—Inflamed tissue with lanolin and rubbing. Much the same as Slide 3, except that the fat globules present are small and fairly disseminated, but the alteration in inflamed tissue was not better than in Slide 3.

Slide 8.—Inflamed tissue with ichthyol and lanolin; no rubbing; much the same as

Slide 4; possibly a greater number of oil globules. Certain areas were markedly infiltrated, and in these dense areas the oil globules were not found; this was not so when rubbing was used. With rubbing when ichthyol and lanolin were fairly disseminated and no dense inflammatory areas in which the globules were not found.

Slide 9.—Ichthyol and lanolin and rubbing; much the same as Slides 5 and 8; more oil globules; the infiltration exudate is widely disseminated. The cells are farther from their nutrition, and, extravascular pressure being relieved, this tends to re-establish circulation. The disseminated cells tend to undergo granular degenerative changes, break down, and are absorbed; the inflammatory intercellular substance more fluid.

In the tissue where rubbing alone was used the inflamed area was less dense; the interspace not so compact; leucocytes granular. Rubbing with lanolin showed no difference, except the presence of the oil globules. Rubbing with ichthyol showed the inflammatory exudate to be more diffused and slightly granular; fewer and smaller leucocytes; the tissue spaces more open; the rubbing and ichthyol evidently tending to dissolve the inflammatory intercellular substance, thereby lessening extravascular pressure and tending to establish increased circulation, promoting absorption of the inflammatory product.

CONCLUSIONS.

That rubbing without either lanolin or ichthyol was good, but rubbing with ichthyol better.

Rubbing with ichthyol and lanolin no better than rubbing with ichthyol alone.

Plain ichthyol without rubbing undoubtedly affects the intercellular inflammatory tissue, but is not as good as ichthyol with rubbing.

Lanolin without rubbing practically of no value.

Ichthyol and lanolin without rubbing no better than ichthyol without rubbing.

In each case where ichthyol was used with rubbing, the tissue was more deeply penetrated with its globules than in any of the lanolin experiments.

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